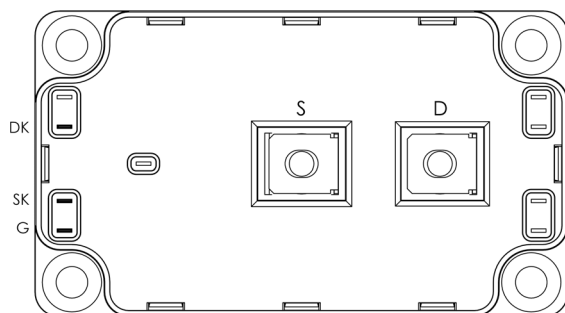
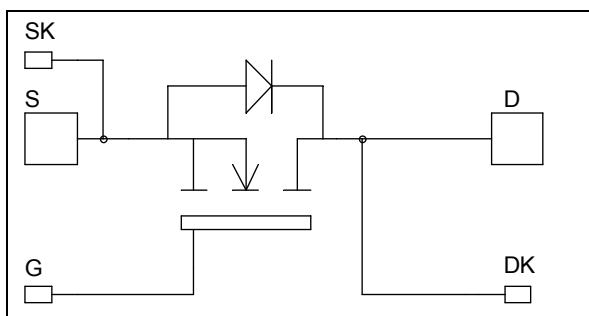


Single Switch MOSFET Power Module

$$V_{DSS} = 500V$$

$$R_{DSon} = 9\text{ m}\Omega \text{ typ @ } T_j = 25^\circ\text{C}$$

$$I_D = 497A \text{ @ } T_c = 25^\circ\text{C}$$



Application

- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

Features

- Power MOS 7[®] FREDFETs
 - Low R_{DSon}
 - Low input and Miller capacitance
 - Low gate charge
 - Fast intrinsic reverse diode
 - Avalanche energy rated
 - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
 - Symmetrical design
 - M5 power connectors
- High level of integration
- AlN substrate for improved thermal performance

Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Low profile
- RoHS Compliant

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	500	V
I_D	Continuous Drain Current	$T_c = 25^\circ\text{C}$ 497	A
		$T_c = 80^\circ\text{C}$ 371	
I_{DM}	Pulsed Drain current	1988	
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	10	m Ω
P_D	Maximum Power Dissipation	$T_c = 25^\circ\text{C}$ 5000	W
I_{AR}	Avalanche current (repetitive and non repetitive)	71	A
E_{AR}	Repetitive Avalanche Energy	50	mJ
E_{AS}	Single Pulse Avalanche Energy	3000	

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on www.microsemi.com

All ratings @ $T_j = 25^\circ\text{C}$ unless otherwise specified

Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 500V$ $T_j = 25^\circ\text{C}$			600	μA
		$V_{GS} = 0V, V_{DS} = 400V$ $T_j = 125^\circ\text{C}$			3000	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 248.5A$		9	10	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 30\text{mA}$	3		5	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 450	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1\text{MHz}$		63.3		nF
C_{oss}	Output Capacitance			12.4		
C_{rss}	Reverse Transfer Capacitance			0.63		
Q_g	Total gate Charge	$V_{GS} = 10V$ $V_{Bus} = 250V$ $I_D = 497A$		1200		nC
Q_{gs}	Gate – Source Charge			300		
Q_{gd}	Gate – Drain Charge			630		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15V$ $V_{Bus} = 333V$ $I_D = 497A$ $R_G = 0.5\Omega$		21		ns
T_r	Rise Time			42		
$T_{d(off)}$	Turn-off Delay Time			96		
T_f	Fall Time			100		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C $V_{GS} = 15V, V_{Bus} = 333V$ $I_D = 497A, R_G = 0.5\Omega$		6		mJ
E_{off}	Turn-off Switching Energy			6.2		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 15V, V_{Bus} = 333V$ $I_D = 497A, R_G = 0.5\Omega$		9.48		mJ
E_{off}	Turn-off Switching Energy			6.96		

Source - Drain diode ratings and characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
I _S	Continuous Source current (Body diode)		T _C = 25°C			497	A
			T _C = 80°C			371	
V _{SD}	Diode Forward Voltage	V _{GS} = 0V, I _S = - 497A				1.3	V
dv/dt	Peak Diode Recovery ❶					18	V/ns
t _{rr}	Reverse Recovery Time	I _S = - 497A V _R = 333V di _S /dt = 600A/μs	T _j = 25°C			300	ns
			T _j = 125°C			600	
Q _{rr}	Reverse Recovery Charge		T _j = 25°C		15.6		μC
			T _j = 125°C		60		

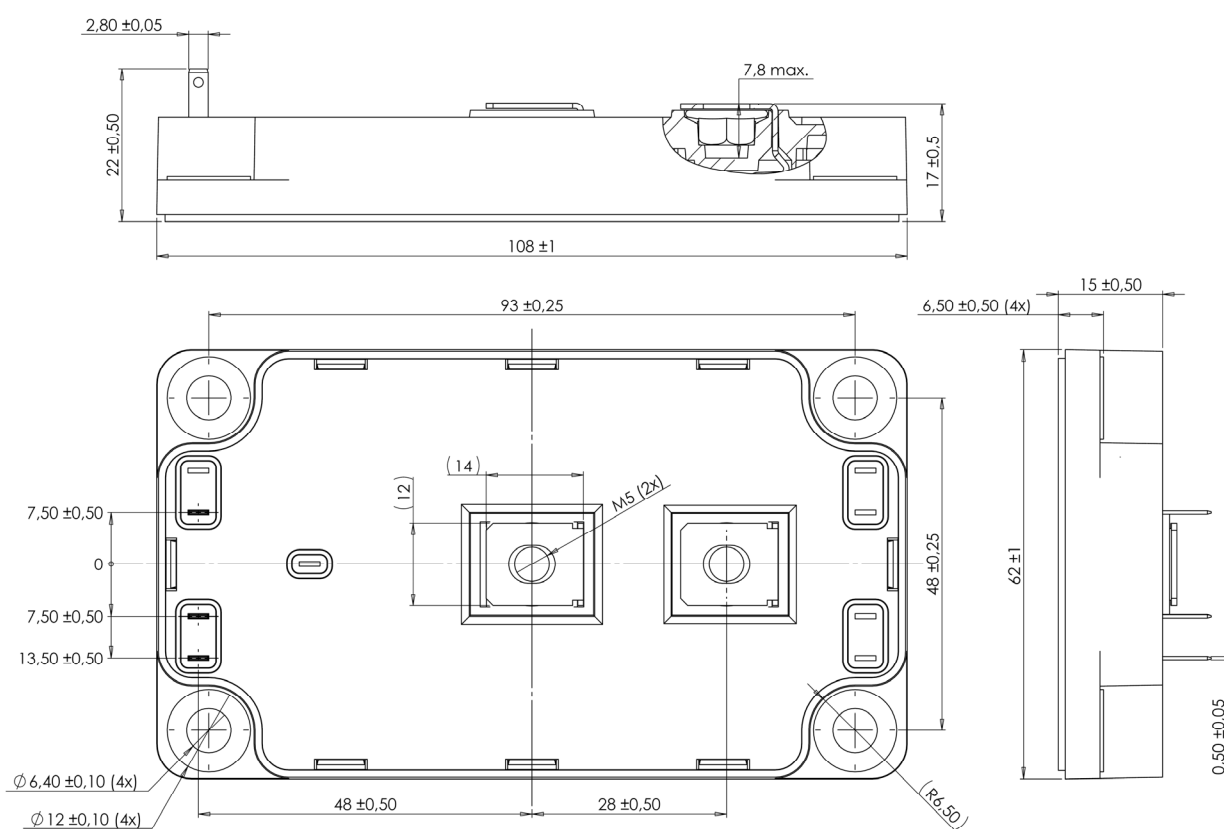
❶ dv/dt numbers reflect the limitations of the circuit rather than the device itself.

$I_S \leq -497A$ $di/dt \leq 700A/\mu\text{s}$ $V_R \leq V_{DSS}$ $T_j \leq 150^\circ\text{C}$

Thermal and package characteristics

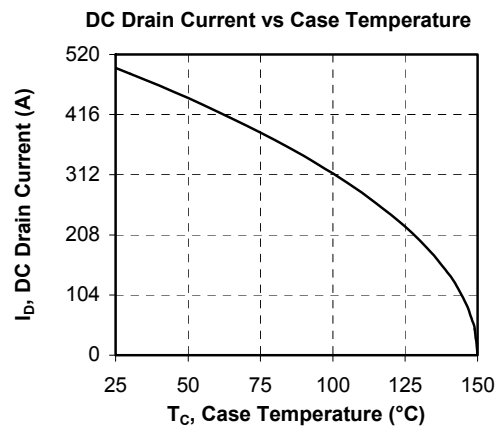
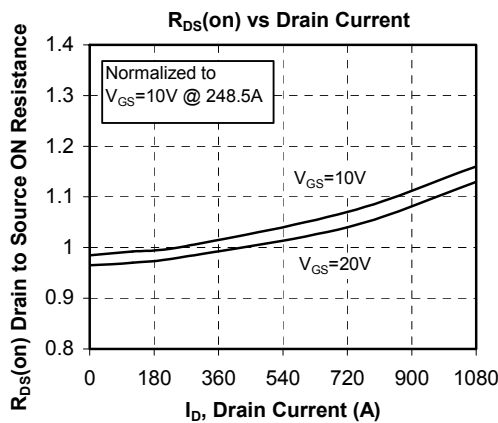
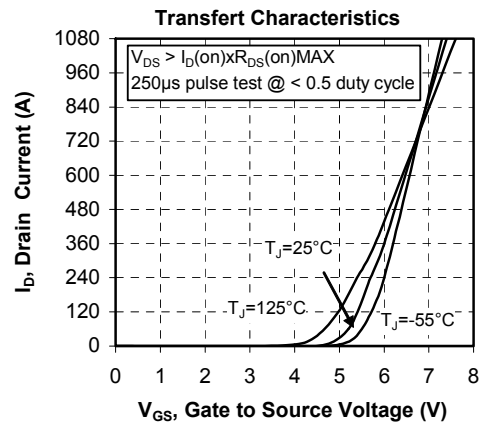
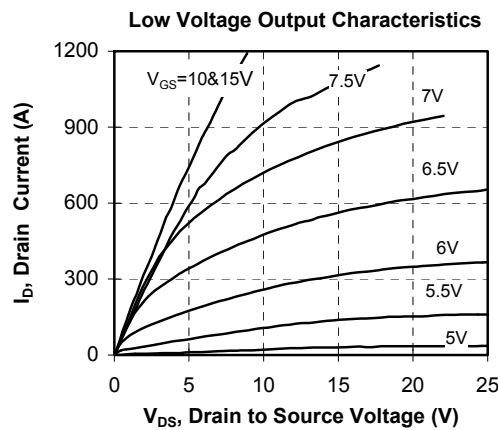
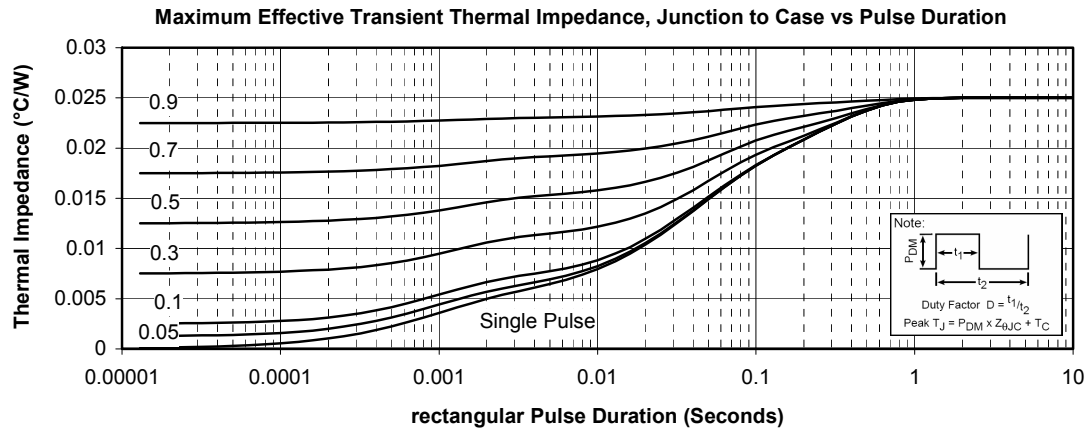
Symbol	Characteristic	Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance			0.025	°C/W
V _{ISOL}	RMS Isolation Voltage, any terminal to case t = 1 min, 50/60Hz	4000			V
T _J	Operating junction temperature range	-40		150	°C
T _{STG}	Storage Temperature Range	-40		125	
T _C	Operating Case Temperature	-40		100	
Torque	Mounting torque	To Heatsink	M6	3	N.m
		For teminals	M5	2	
Wt	Package Weight			300	g

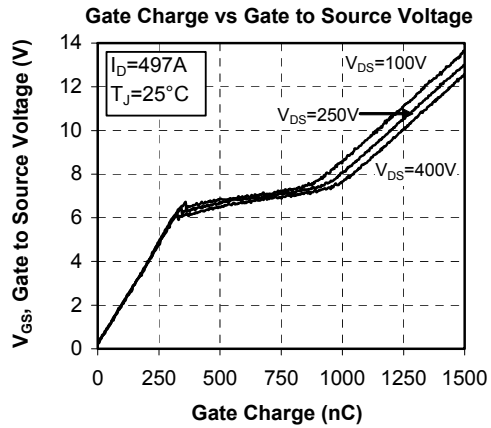
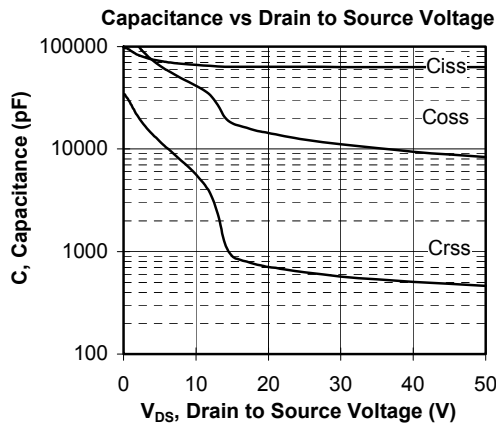
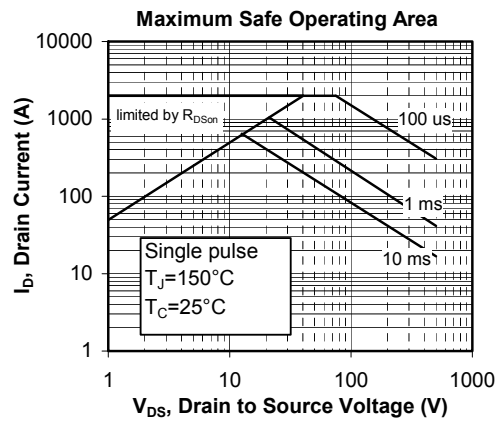
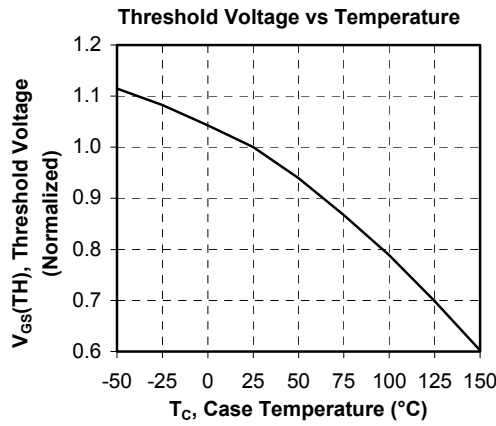
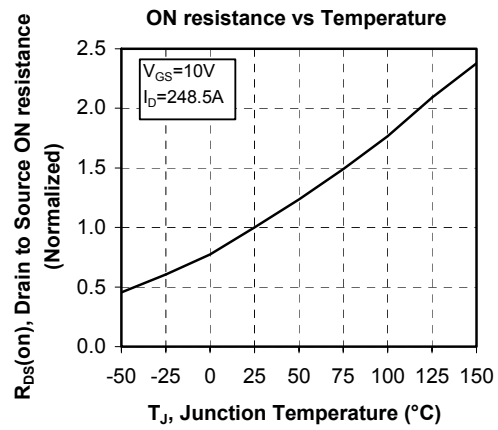
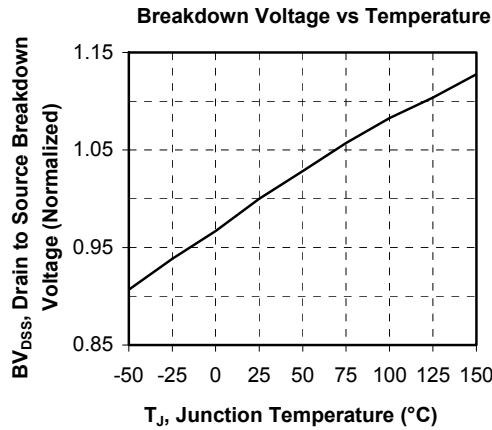
SP6 Package outline (dimensions in mm)

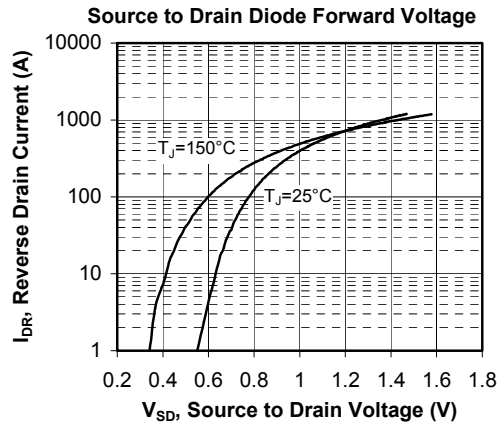
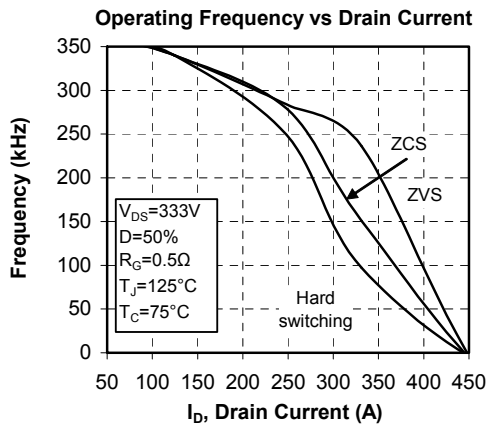
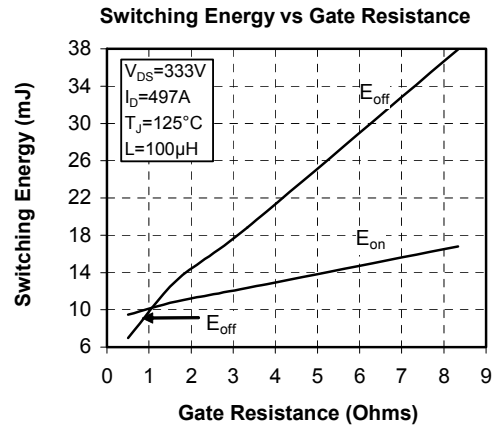
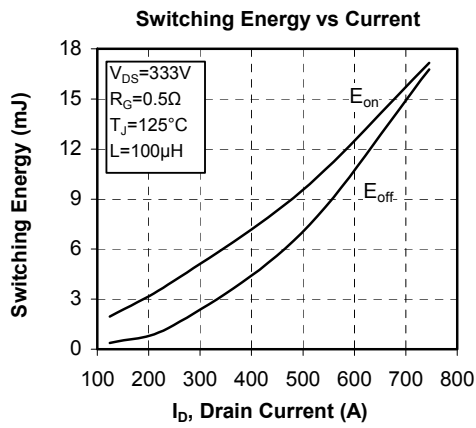
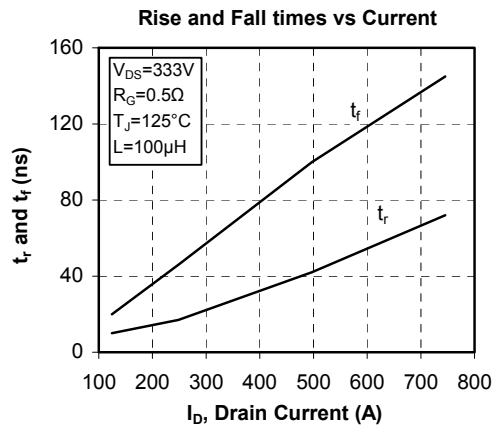
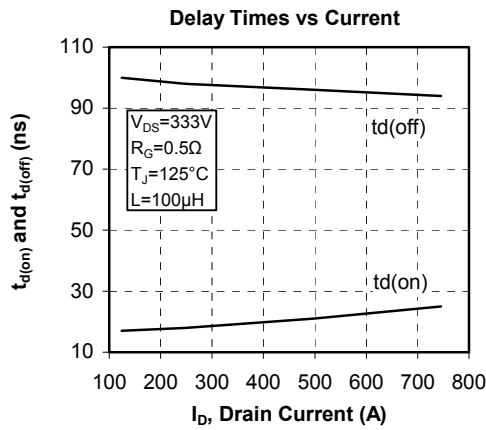


See application note APT0601 - Mounting Instructions for SP6 Power Modules on www.microsemi.com

Typical Performance Curve







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